Reference material re Formaldehyde; Uses, Sources etc
From EPA/CDC/Chemical industry
EPA

Formaldehyde A colorless water-soluble gas. Due to its wide use, it is frequently considered separately from other VOCs. Materials containing formaldehyde include building materials, furnishing, and some consumer products. Formaldehyde has a pungent odor and is detected by many people at levels of about 100 parts per billion (ppb). Besides the annoyance, it also causes acute eye burning and irritates mucous membranes and the respiratory tract. EPA has determined formaldehyde to be a probable human carcinogen. See also www.epa.gov/iaq/formaldehyde.html - From Indoor Air Quality Glossary
- Search all glossaries for terms containing **formaldehyde** </SPAN< span>

What are the potential sources of formaldehyde emissions in buildings and how do they affect indoor air quality?

"Formaldehyde is an important chemical used widely by industry to manufacture building materials and numerous household products. It is also a by-product of combustion and certain other natural processes. Thus, it may be present in substantial concentrations both indoors and outdoors.

Sources of formaldehyde in the home include building materials, smoking, household products, and the use of un-vented, fuel-burning appliances, like gas stoves or kerosene space heaters. Formaldehyde, by itself or in combination with other chemicals, serves a number of purposes in manufactured products. For example, it is used to add permanent-press qualities to clothing and draperies, as a component of glues and adhesives, and as a preservative in some paints and coating products.

In homes, the most significant sources of formaldehyde are likely to be pressed wood products made using adhesives that contain urea-formaldehyde (UF) resins.

Formaldehyde, a colorless, pungent-smelling gas, can cause watery eyes, burning sensations in the eyes and throat, nausea, and difficulty in breathing in some humans exposed at elevated levels (above 0.1 parts per million). High concentrations may trigger attacks in people with asthma. There is evidence that some people can develop a sensitivity to formaldehyde. It has also been shown to cause cancer in animals and may cause cancer in humans."

This information is taken from the An Introduction of Indoor Air Quality (IAQ) - Formaldehyde Web site, which also provides information on reducing exposure and links to additional resources. You can visit this page at: http://www.epa.gov/iaq/formalde.html

What are the uses of formaldehyde?

Formaldehyde, by itself or in combination with other chemicals, serves a number of purposes in manufactured products. For example, it is used to add permanent-press qualities to clothing and draperies, as a component of glues and adhesives, and as a preservative in some paints and coating products. It is also a by-product of combustion and certain other natural processes.

Formaldehyde

Basic Information on Pollutants and Sources of Indoor Air Pollution

- Formaldehyde/Pressed Wood Products
- Volatile Organic Compounds (VOCs)

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TSCA Assistance Line

For further information on formaldehyde and consumer products, call the EPA Toxic Substance Control Act (TSCA) **Assistance Line** (202) 554-1404.

In homes, the most significant sources of formaldehyde are likely to be pressed wood products made using adhesives that contain urea-formaldehyde (UF) resins. Pressed wood products made for indoor use include: particleboard (used as sub-flooring and shelving and in cabinetry and furniture); hardwood plywood paneling (used for decorative wall covering and used in cabinets and furniture); and medium density fiberboard (used for drawer fronts, cabinets, and furniture tops). Medium density fiberboard contains a higher resin-to-wood ratio than any other UF pressed wood product and is generally recognized as being the highest formaldehyde-emitting pressed wood product.

Other pressed wood products, such as softwood plywood and flake or oriented strand board, are produced for exterior construction use and contain the dark, or red/black-colored phenol-formaldehyde (PF) resin. Although formaldehyde is present in both types of resins, pressed woods that contain PF resin generally emit formaldehyde at considerably lower rates than those containing UF resin.

pleasee Note: The main sources of information for this fact sheet are EPA's *Health and Environmental Effects Profile for Formaldehyde* and the Integrated Risk Information System (IRIS), which contains information on oral chronic toxicity and the RfD, and the carcinogenic effects of formaldehyde including the unit cancer risk for inhalation exposure.

Uses

- Formaldehyde is used predominantly as a chemical intermediate. It also has minor uses in agriculture, as an analytical reagent, in concrete and plaster additives, cosmetics, disinfectants, fumigants, photography, and wood preservation. (1,2)
- One of the most common uses of formaldehyde in the U.S is manufacturing urea-formaldehyde resins, used in particleboard products. (7)
- Formaldehyde (as urea formaldehyde foam) was extensively used as an insulating material until 1982 when it was banned by the U.S. Consumer Product Safety Commission.

Physical Properties

- The chemical formula for formaldehyde is CH_2O and the molecular weight is 30.03 g/mol. (1)
- The vapor pressure for formaldehyde is 10 mm Hg at -88 °C, and its log octanol/water partition coefficient (log K_{ow}) is -0.65. (1)
- Formaldehyde is a colorless gas with a pungent, suffocating odor at room temperature; the odor threshold for formaldehyde is 0.83 ppm. (1,8)
- Formaldehyde is readily soluble in water at room temperature. (1)
- Commercial formaldehyde is produced and sold as an aqueous solution containing 37 to 50 percent formaldehyde by weight. (1)

ATSDR site

What is formaldehyde?

At room temperature, formaldehyde is a colorless, flammable gas that has a distinct, pungent smell. It is produced by both human and natural sources. Small amounts of formaldehyde are naturally produced by plants, animals, and humans.

It is used in the production of fertilizer, paper, plywood, and urea-formaldehyde resins. It is also used as a preservative in some foods and in many products used around the house, such as antiseptics, medicines, and cosmetics.

What happens to formaldehyde when it enters the environment?

- Formaldehyde is quickly broken down in the air, usually within hours.
- Formaldehyde dissolves easily but does not last a long time in water.
- Formaldehyde evaporates from shallow soils.
- Formaldehyde does not build up in plants and animals.

California

Formaldehyde

Overexposure to formaldehyde irritates the eyes, nose, throat, and skin. Formaldehyde can cause allergic reactions of the skin (dermatitis) and the lungs (asthma). Formaldehyde is a known cause of cancer in humans.

How formaldehyde is used and where it's found

Formaldehyde is used as a…

• disinfectant and sterilant,* • fumigant, • preservative, and in… • embalming fluid, • some keratin-based hair smoothing treatments.

Some synonyms and trade names of formaldehyde products

formalin BFV
methaldehyde Fannoform
methanal Formalith
methyl aldehyde Formol
methylene glycol Fyde
methylene oxide Ivalon
oxomethane Karsan
oxymethylene Lysoform
paraform Morbicid
paraformaldehyde
* (other aldehydes used include glutaraldehyde and ortho-phthalaldehyde)

California Department of Public Health • California Department of Industrial Relations
FEBRUARY 2011 (revised)

It is used in making…

• chemical resins • wrinkle-proof fabrics • rubber products • latex paints • dyes • plastics • paper products, and • cosmetics.

It is found in…

• insulation materials • plywood • particle board • adhesives • glues • paint primers, and • fingernail products.

Any of these materials may give off formaldehyde vapors.

Formaldehyde is also present in combustion products, such as vehicle exhaust and tobacco smoke.

American Chemistry Council

Dependent Products

With a versatility born of simplicity, formaldehyde is one of the ancient building blocks utilized by, and available to, countless forms of life. The same holds true for commercial applications where numerous industries have capitalized on its ease of use.

Home Construction Applications

- Asphalt shingles
- Sheathing & cladding
- Walls & wall panels
- Floors & roof
- Electrical boxes & outlets
- Furniture
- Counter tops, cabinets & cabinet doors
- Appliances: washers, dryers, & dishwasher
- Plumbing: faucets, showerheads, & valve mechanisms
- Paints & varnishes

Aerospace Applications

- Brake pads
- Landing gear
- Lubricants
- Seats
- Seatbelt buckles
- Insulation of doors and windows
- Interior walls and floors
- Tire cord adhesive

Automotive Applications

- Fuel System components (pump housings, filters, impellers, reservoirs, senders, gas caps)
- Under the hood (molded components, engine & metallic parts, automatic transmission parts, carburetor floats)
- Exterior (exterior primer, clear coat & trim, tire cord adhesive, bumper)
- Interior (seats, steering wheel, interior trim, brake pads, dashboard, locks, door panels, cup holders, head rests & windshield wiper parts)

Applications

- Common Uses
- Dependent Products

Latest press release

Formaldehyde Is Biodegradable, Quickly Broken Down in the Air By Sunlight or By Bacteria in Soil or Water [1/29/2014]

Continue Reading

American Chemistry Council

Formaldehyde Use in Building and Construction

WASHINGTON (January 29, 2014) – *The Formaldehyde Panel of the American Chemistry Council has issued the following statement in response to media reports that West Virginians may be breathing formaldehyde following the recent incident in the state:*

"Formaldehyde is a ubiquitous, naturally occurring substance produced by every living organism. Studies show that formaldehyde is readily biodegradable and does not accumulate in either the environment or in people. In the environment, formaldehyde is quickly broken down in the air by sunlight or by bacteria in soil or water." [1]

Formaldehyde, the Simple Molecule

Formaldehyde is a simple chemical compound made of hydrogen, oxygen and carbon, with the formula CH_2O. All organic life forms--bacteria, plants, fish, animals and humans--make formaldehyde at various levels. Formaldehyde does not accumulate in the environment or within plants, animals or people, as metabolic processes quickly break it down in the body and the atmosphere.

First used as a biological preservative more than a century ago, formaldehyde has since become an essential part of the production of hundreds of beneficial products that are used every day in homes and factories. Formaldehyde-based technologies are an important part of the U.S. economy, as they are used to produce a wide range of materials.

What is Formaldehyde? Why is Formaldehyde Chemistry So Special?

Featured Highlights

Faulty Science Comments Can Quickly Spin Out of Control

Formaldehyde Is Biodegradable, Quickly Broken Down in the Air By Sunlight or By Bacteria in Soil or Water

Clean Living, Baby: Naturally Occurring Chemicals [*Fort McMurray Today*]

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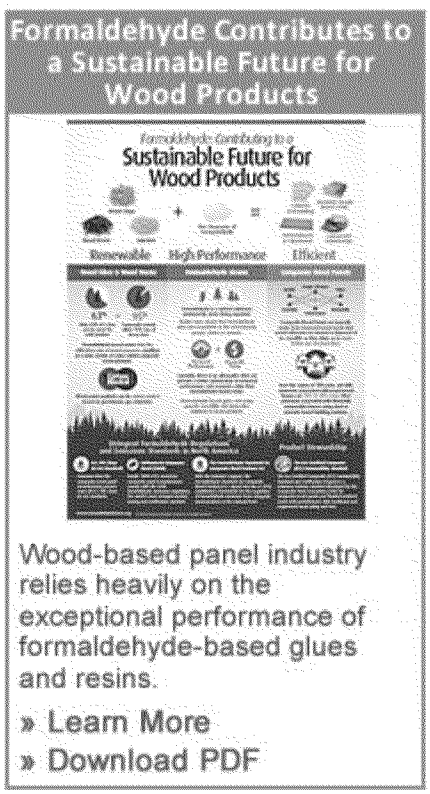
Formaldehyde Resources

View the latest quick facts and related links about formaldehyde and its uses.

- Links
- Quick Facts



This simple molecule plays an invaluable role, its benefits have been **improving our lives** for more than a century.

What is formaldehyde? Why is formaldehyde chemistry so special?

Naturally occurring formaldehyde is found all around us; it is present in low levels within our body, it is in a wide variety of fruits, vegetables, meats and beverages; it's even in trees. Since its discovery in 1859, formaldehyde has become an essential ingredient in the development of a variety of everyday items, from vaccines to your kitchen table.

Formaldehyde is a stable molecule, formed by adding two hydrogen atoms to a carbonyl group. Chemically, it has the symbol HCHO (add a picture of the chemical structure). It is the carbonyl

group or functionality that makes formaldehyde react so well with other molecules. This functionality enables formaldehyde to bind tightly with other molecules, making it an ideal substance for linking substances together to form unique and versatile performance attributes.

The ability for formaldehyde, in combination with countless other molecules, to chemically react and subsequently build resilient structures makes it one of the most functionally important chemical building blocks in the manufacturing world today. It plays an integral role in a wide variety of industrial applications across the automotive, aviation, textile, energy and building and construction industry sectors, among others